



ATA MANUAL

COMPONENT MAINTENANCE
WITH ILLUSTRATED PARTS LIST

OXYGEN SHUT-OFF VALVE

P/N 27550-1

P/N 27550-3

P/N 27550-5

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27550

COMPONENT MAINTENANCE MANUAL WITH IPL

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LIST OF EFFECTIVE PAGES

<u>SUBJECT</u>	<u>PAGE</u>	<u>DATE</u>
Title	*T-1	Mar 31/83
Record of Revisions	*RR-1	Mar 31/83
Temporary Revisions	*TR-1	Mar 31/83
Service Bulletin List	*SB-1	Mar 31/83
List of Effective Pages	*LEP-1	Mar 31/83
Table of Contents	*T/C-1	Mar 31/83
Introduction	INTRO-1	Mar 31/83
Description and Operation	*1	Mar 31/83
	*2	Mar 31/83
	*3	Mar 31/83
	*4	Blank
Testing and Fault Isolation	*101	Mar 31/83
	*102	Mar 31/83
	*103	Mar 31/83
	*104	Blank
Disassembly	*301	Mar 31/83
	*302	Blank
Cleaning	*401	Mar 31/83
	*402	Blank
Check	*501	Mar 31/83
	*502	Blank
Repair	*601	Mar 31/83
	*602	Blank
Assembly	*701	Mar 31/83
	*702	Mar 31/83
Fits and Clearances	*801	Mar 31/83
	*802	Blank
Special Tools, Fixtures and Test Equipment	*901	Mar 31/83
	*902	Blank
Illustrated Parts List	*1001	Mar 31/83
	*1002	Mar 31/83
	*1003	Mar 31/83
	*1004	Blank

*The asterisk indicates pages added or revised by the current revision.
Insert revised/added pages, destroy superseded pages.

SCOTT

27550

COMPONENT MAINTENANCE MANUAL WITH IPL

TABLE OF CONTENTS

Section	Page No.
Introduction	INTRO-1
Description and Operation	1
Testing and Fault Isolation	101
Automatic Test Requirements (Atlas)	201
(Not Applicable)	
Disassembly	301
Cleaning	401
Check	501
Repair	601
Assembly	701
Fits and Clearances	801
Special Tools, Fixtures and Equipment	901
Illustrated Parts List	1001

35-01-22

T/C-1

Mar 31/83

INTRODUCTION

This manual establishes the proper maintenance procedures which shall be followed by user maintenance, overhaul and service personnel when performing any type of service on the 27550 Oxygen Shut-Off Valves described herein.

It is the primary intent of this manual:

- a. To specify proper safety regulations to be followed during performance of service on oxygen equipment used in aviation applications.
- b. To establish proper sequence of operations to be performed on the defined equipment.
- c. To provide the user with the data necessary to properly maintain, check, test and repair the equipment.

The following WARNINGS are presented to inform the user of this manual of the requirements which shall be adhered to when performing service procedures on this equipment. Additional WARNINGS will be found in the procedural steps in the manual.

WARNING: ANY SERVICE OR OVERHAUL PERFORMED ON THIS APPARATUS SHALL BE DONE ONLY BY THOSE FACILITIES EXPERIENCED IN, OR BY PERSONNEL KNOWLEDGEABLE IN AVIATION OXYGEN EQUIPMENT. IF NONE ARE KNOWN, CONTACT SCOTT AVIATION OR ITS DISTRIBUTORS FOR NAMES OF AUTHORIZED SERVICE CENTERS.

WARNING: ALL PROCEDURES DESCRIBED IN THIS MANUAL SHALL BE PERFORMED IN AN AREA FREE OF OIL, GREASE, FLAMMABLE SOLVENTS OR OTHER COMBUSTIBLE MATERIALS. SUCH MATERIALS, AS WELL AS DUST, LINT, AND FINE METAL FILINGS ARE ALL POTENTIAL COMBUSTIBLES WHICH MIGHT, WHEN EXPOSED TO OXYGEN UNDER PRESSURE IGNITE AND RESULT IN AN EXPLOSION AND/OR FIRE.

WARNING: DO NOT ALLOW OIL, GREASE, FLAMMABLE SOLVENTS, OR OTHER COMBUSTIBLE MATERIALS TO COME IN CONTACT WITH PARTS THAT WILL BE EXPOSED TO PRESSURIZED OXYGEN. SUCH MATERIALS, AS WELL AS DUST, LINT, AND FINE METAL FILINGS ARE ALL POTENTIAL COMBUSTIBLES WHICH MIGHT, WHEN EXPOSED TO OXYGEN UNDER PRESSURE, IGNITE AND RESULT IN AN EXPLOSION.

DESCRIPTION AND OPERATION

1. General

- A. This manual provides overhaul instructions with illustrated parts list for the Oxygen Shut-Off Valve, Part Numbers 27550-1, 27550-3 and 27550-5 (see figure 1).

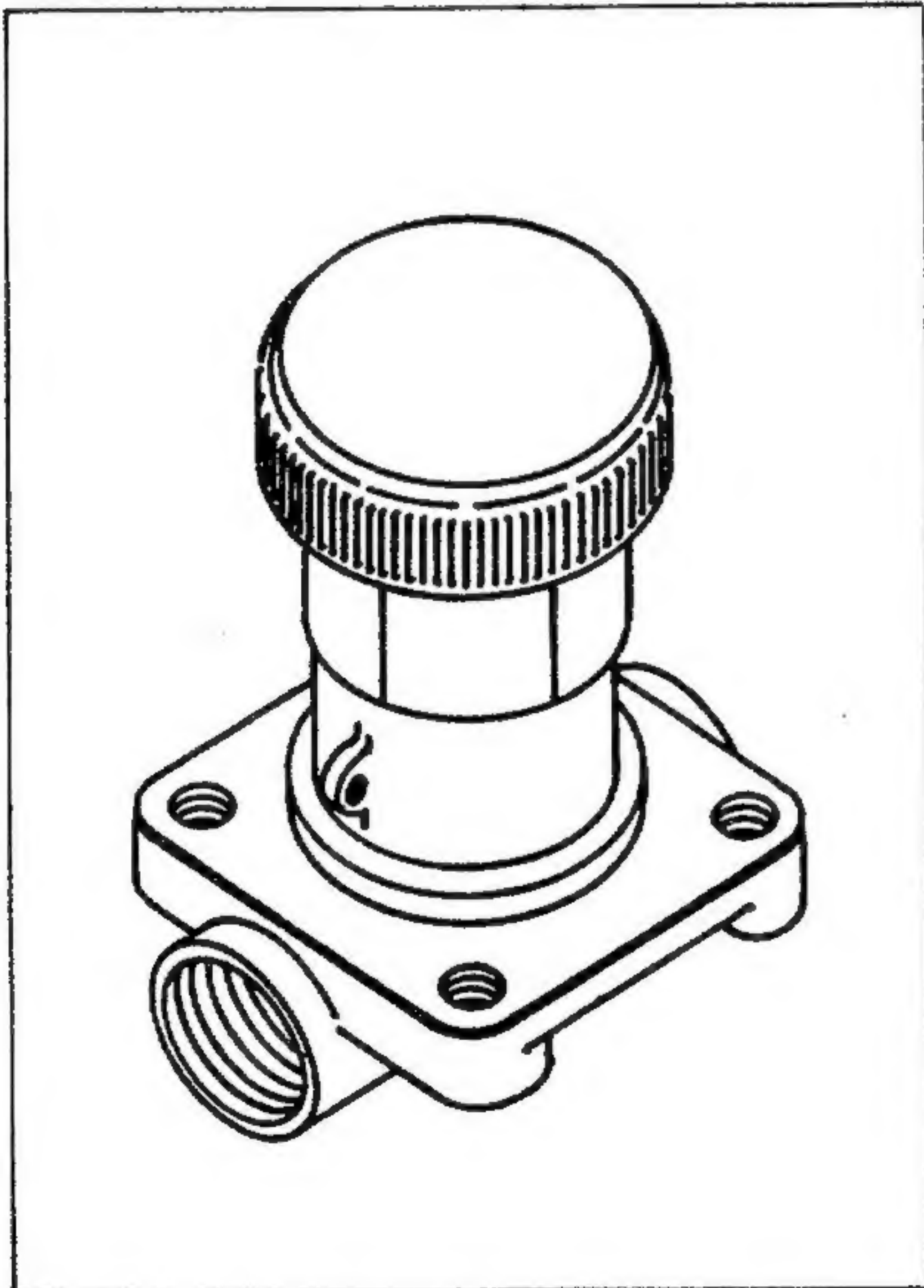
2. Purpose of Equipment

- A. The Oxygen Shut-Off Valve, hereinafter referred to as the valve, Part Numbers 27550-1, 27550-3 and 27550-5 (see figure 1), with mounting facilities is a manually operated slow opening oxygen valve capable of metering flow. It is designed for oxygen service up to 2000 psi. The valve is used as a line shut-off valve in the aircraft oxygen system to activate the oxygen system when installed per figure 2.

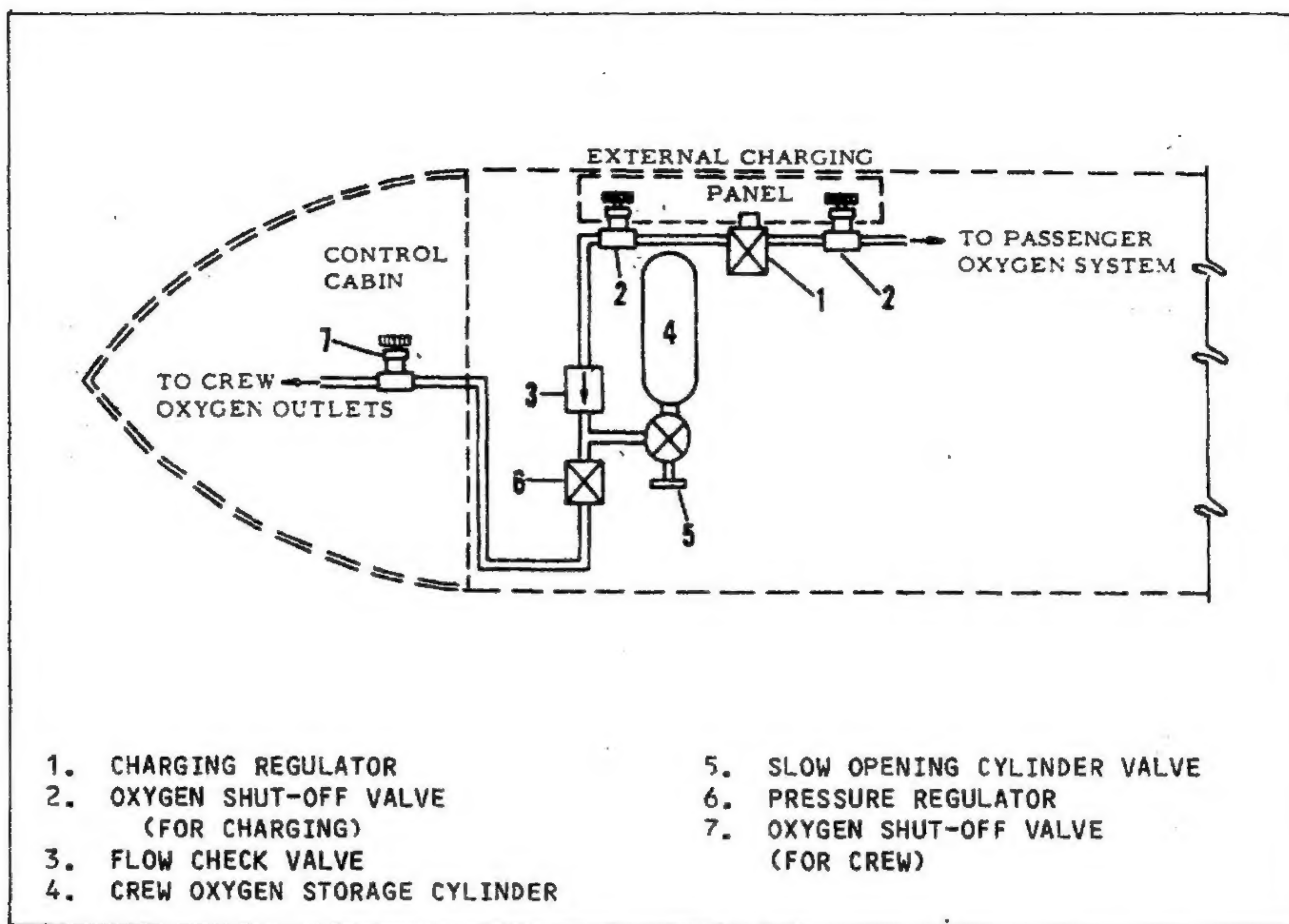
3. Installation

CAUTION: INSTALL THE VALVE WITH THE ARROW, CAST IN THE BODY, ON THE UPSTREAM SIDE OF THE VALVE, POINTING DOWNSTREAM.

- A. A typical aircraft installation of the valve is shown in figure 2. During charging operations, oxygen shut-off valves (2) serve to isolate the crew or passenger oxygen systems while charging through regulator (1). Crew oxygen, which is stored in cylinder (4) and controlled by regulator (6), may be shut off in the control cabin by a similar oxygen shut-off valve (7).



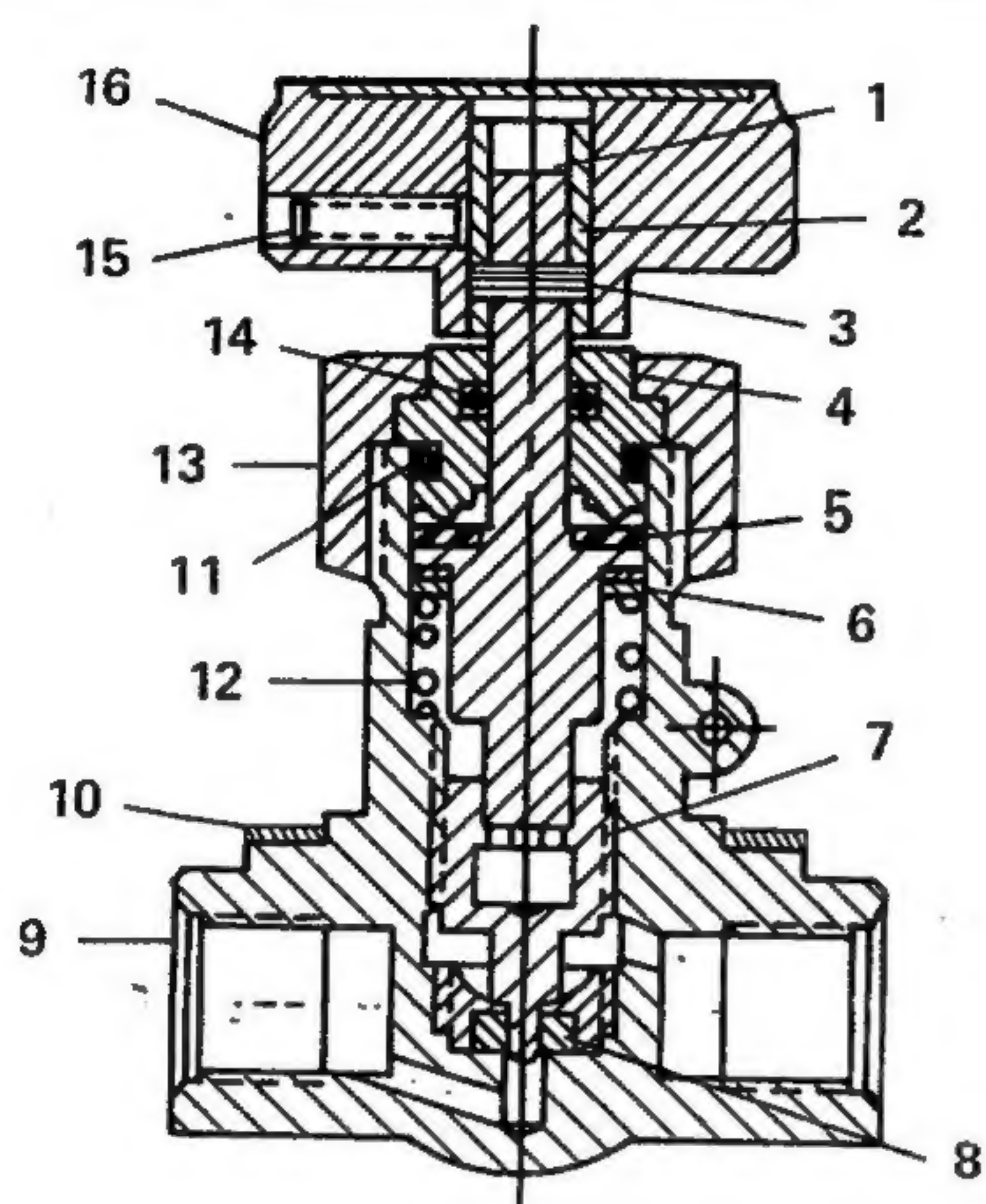
Oxygen Shut-Off Valve
Figure 1



Typical Installation
Figure 2

4. Operation

- A. When the valve is closed, as shown in figure 3, valve plug (7), which is threaded on body (9), is seated on valve seat (8). As valve handle (16) is opened, stem (1) remains in a stationary vertical position and transfers its rotary motion to valve plug (7) via a square shank. Valve plug (7) rises within body (9) while sliding up square shank of stem (1) to unseat. Stem sealing is accomplished by gasket (5) and packing (14). Spring (12) retains tension on stem (1) to seal gasket (5) to guide (4). Retainer (13) holds guide (4) in position and seats packing (11) on body (9). Thrust washers (6) absorb stem (1) thrust to avoid damage to body (9). Handle insert (2), rollpin (3), and setscrew (15) secure stem (1) to handle (16). Gasket (10) is provided to seal the valve against its mounting panel.



- 1. STEM
- 2. HANDLE INSERT
- 3. ROLLPIN
- 4. GUIDE
- 5. GASKET
- 6. THRUST WASHERS
- 7. VALVE PLUG
- 8. VALVE SEAT
- 9. BODY
- 10. GASKET
- 11. PACKING
- 12. SPRING
- 13. RETAINER
- 14. PACKING
- 15. SETSCREW
- 16. HANDLE

Oxygen Valve Assembly Cross Section
Figure 3

TESTING AND FAULT ISOLATION

1. Testing

WARNING: IN ALL PROCEDURES LISTED BELOW, OXYGEN IS SPECIFIED AS THE TEST GAS. WATER PUMPED NITROGEN OR OIL-FREE AIR MAY BE SUBSTITUTED, BUT RESULTS MUST BE CONVERTED PRIOR TO BEING COMPARED WITH THE RESULTS SPECIFIED FOR OXYGEN. DO NOT, UNDER ANY CIRCUMSTANCES, USE OIL PUMPED GAS AS THIS WILL CAUSE CONTAMINATION OF THE REGULATOR VALVE AND TEST EQUIPMENT. OIL, EVEN IN MINUTE QUANTITY, COMING IN CONTACT WITH OXYGEN MAY CAUSE AN EXPLOSION OR FIRE.

NOTE: Table 101 lists the consumable materials necessary for testing. Equivalent materials may be used.

MATERIAL	DESCRIPTION	MANUFACTURER*	REFER TO TESTING PARA
Oxygen	MIL-O-27210, Type I	V07098	A (3) B (2)

*Refer to Illustrated Parts List, paragraph 2.C for Vendor Code.

List of Consumable Materials for Testing
Table 101

A. Check Leakage.

- (1) Plug the valve outlet (downstream of arrow head).
- (2) Turn handle (60, IPL figure 1) 1-1/2 turns open.
- (3) Apply an oxygen pressure of 50 psi to valve inlet.
- (4) Submerge valve in water, treated with rust inhibitor, for five minutes.
- (5) There shall be no leakage.
- (6) Raise input pressure to 2000 psi and repeat steps (4) and (5).
- (7) Relieve pressure. Remove valve from water.
- (8) Dry valve with clean, dry, oil-free air.
- (9) Turn handle (60) to full closed position.
- (10) Remove plug from valve outlet.
- (11) Apply 50 psi, attach a hose to valve outlet and submerge open end of hose in water for five minutes.
- (12) There shall be no leakage.
- (13) Raise input pressure to 2000 psi at valve inlet and repeat steps (11) and (12).
- (14) Relieve input pressure.

COMPONENT MAINTENANCE MANUAL WITH IPL

- (15) Remove valve from water.
- (16) Remove hose from valve outlet.
- (17) Dry valve with clean, dry, oil-free air or nitrogen.

NOTE: Crack valve slightly to purge, thus assuring that all water and moisture are removed from the valve.

B. Check Valve Flow.

- (1) Turn handle (60, IPL figure 1) to full closed position.
- (2) Apply an oxygen pressure of 2000 psi to valve inlet.
- (3) Connect a flowmeter to valve outlet.
- (4) Open valve gradually, and check flow versus handle position per figure 101.
- (5) Check handle turning torque during test. Torque required to open or close valve must not exceed 15 inch-pounds (1.70 N.m).

VALVE HANDLE TURNS FROM CLOSED POSITION	OUTLET FLOW - LITERS/MINUTES	
	MINIMUM FLOW*	MAXIMUM FLOW*
1/4	0	75
1/2	0	200
3/4	15	550
1	100	900
1-1/4	350	1270
1-1/2	720	1620
1-3/4	1080	1960
2	1440	2325

*Outlet flow depends on valve handle (60, IPL figure 1) position. When the valve is fully closed, a 3/4 turn, counterclockwise, would be required before flow begins. If the valve handle is rotated clockwise so that flow is just cut off, flow will begin almost immediately on counterclockwise rotation of the valve handle.

Valve Handle Position and Outlet Flow
Figure 101

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27550
COMPONENT MAINTENANCE MANUAL WITH IPL

2. Fault Isolation

A. Refer to figure 102 for a chart containing troubles, probable causes and remedies.

TROUBLE	PROBABLE CAUSE	REMEDY
Valve Leaks	Defective gasket on stem assembly (170 or 180, IPL figure 1) or defective washer (140)	Replace stem assembly or washer
	Retainer (110) not tightened to proper torque value	Torque per Table 801
	Defective spring (210)	Replace spring
	Defective valve seat assembly (240)	Replace valve seat assembly
Valve will not open or close	Defective plug (230)	Replace plug

Trouble Shooting
Figure 102

35-01-22

Page 103/104
Mar 31/83

27550
COMPONENT MAINTENANCE MANUAL WITH IPL

DISASSEMBLY (See IPL figure 1)

NOTE: See Testing and Fault Isolation, to establish the condition of the unit or most probable cause of its malfunction. This is to determine the extent of disassembly required without completely tearing down and rebuilding the unit.

1. Disassemble the valve as follows:

NOTE: Do not remove plate (10) unless it is damaged or illegible and must be replaced.

- A. Cut and remove lock wire from retainer (110), handle (60) and body (260).
- B. Remove setscrew (80) and handle (60).
- C. Remove pin (100) and insert (90).
- D. Remove retainer (110) and guide (120 or 130); remove packings (150 or 160) from guide (130).
- E. Remove washer (140), stem assembly (170 or 180), washers (190 and 200) and spring (210).
- F. Remove washer (220), plug (230), valve seat assembly (240), and gasket (250) from body (260).

CLEANING

NOTE: Cleaning materials used for the procedures described herein are listed in Table 401. Equivalent materials may be used.

MATERIAL	DESCRIPTION	MANUFACTURER*	REFER TO PARA
1,1,1 Trichloroethane (stabilized)	MIL-T-81533	V91784	1.A

*Refer to Illustrated Parts List, paragraph 2.C for Vendor Code.

List of Cleaning Materials
Table 401

WARNING: DO NOT ALLOW OIL, GREASE, FLAMMABLE SOLVENTS, OR OTHER COMBUSTIBLE MATERIALS TO COME IN CONTACT WITH PARTS THAT WILL BE EXPOSED TO PRESSURIZED OXYGEN. SUCH MATERIALS, AS WELL AS DUST, LINT, AND FINE METAL FILINGS, ARE ALL POTENTIAL COMBUSTIBLES WHICH MIGHT, WHEN EXPOSED TO OXYGEN UNDER PRESSURE, IGNITE AND RESULT IN AN EXPLOSION.

1. Metal parts which come in contact with oxygen and have become contaminated with grease can be cleaned using the following method.

WARNING: USE 1,1,1 TRICHLOROETHANE IN A WELL-VENTILATED AREA ONLY. AVOID PROLONGED OR REPEATED CONTACT WITH SKIN AND INHALATION OF TOXIC VAPORS.

- A. Use a vapor degreasing method with stabilized 1,1,1 trichloroethane. Blow clean and dry with a stream of clean, dry, oil-free air.
2. Metal parts should be cleaned prior to assembly using the method described above.

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27550
COMPONENT MAINTENANCE MANUAL WITH IPL

CHECK

1. Inspect parts of valve (see IPL figure 1).
 - (1) Visually examine all parts for cracks, nicks, burrs, damaged threads, or other evidence of damage.
 - (2) Visually examine all metal parts that may come into contact with oxygen for contamination.
 - (3) Visually examine all metal parts for wear and/or corrosion.

NOTE: Refer to Table 801 for acceptable fits and clearances.

35-01-22

Page 501/502
Mar 31/83

SCOTT

27550

COMPONENT MAINTENANCE MANUAL WITH IPL

REPAIR (See IPL figure 1)


1. Repairs shall be limited to the removal of burrs or thread chasing.
All parts found to be otherwise damaged or worn shall be replaced.
 - A. At overhaul, replace washers (140 and 190) and gasket (25) regardless of condition.
 - B. At overhaul, it is recommended that stem assembly (170 and 180) and valve seat assembly (240) be replaced regardless of condition.

35-01-22

Page 601/602
Mar 31/83

27550
COMPONENT MAINTENANCE MANUAL WITH IPLASSEMBLY

NOTE: Materials used during assembly of the valve, as described herein, are listed in Table 701. Equivalent materials may be used except for oxygen lubricant.

MATERIAL	DESCRIPTION	MANUFACTURER 	REFER TO PARA
Dry Film Lubricant	Molykote 106	V 71984	1.B
Oxygen Lubricant	Krytox 240AC	V 18873	1.D
Lockwire	MS20995C20	-----	1.K

 Refer to Illustrated Parts List, paragraph 2.C for Vendor Codes.

List of Consumable Materials for Assembly
Table 701

1. Assemble the valve as follows: (see IPL figure 1)

WARNING: DO NOT ALLOW OIL, GREASE, FLAMMABLE SOLVENTS, OR OTHER COMBUSTIBLE MATERIALS TO COME IN CONTACT WITH PARTS THAT WILL BE EXPOSED TO PRESSURIZED OXYGEN. SUCH MATERIALS, AS WELL AS DUST, LINT, AND FINE METAL FILINGS, ARE ALL POTENTIAL COMBUSTIBLES WHICH MIGHT, WHEN EXPOSED TO OXYGEN UNDER PRESSURE, IGNITE AND RESULT IN AN EXPLOSION.

- A. Torque valve seat assembly (240) into body (260) per Table 801 using wrench (1, figure 901).
- B. If necessary, apply a very light coat of Molykote 106 to the threads of plug (230, IPL figure 1) and bake at 260°F (126.6°C) for one hour. Then, install plug (230) in body (260) using wrench (2, figure 901).
- C. Place washer (220, IPL figure 1) and spring (210) into body (260).
- D. Lubricate washers (190 and 200) and stem assembly (170 or 180) and packings (150 and 160) with a thin film of Krytox.

NOTE: Use Krytox sparingly.

- E. Place washers (190 and 200) and stem assembly (170 or 180) into body (260), and place washer (140) and guide (120) or guide (130) onto stem assembly (170 or 180).

NOTE: Be certain square shank of stem assembly (170 or 180) is properly engaged into square hole of plug (230). Damage to plug can result if not properly engaged.

- F. Torque retainer (110) onto body (260) per Table 801.
G. Place insert (90) onto stem assembly (170 or 180) and secure in place with pin (100).
H. Place a new gasket (250) onto body (260).
J. Place handle (60) onto insert (90), and secure with setscrew (80).
K. Lock retainer (110) and handle (60), as applicable, to valve body (260) with lockwire per Military Standard MS33540.

2. Storage Instructions

- A. Prepare the valve for storage as follows:

- (1) Seal all valve ports to prevent foreign matter from entering valve.
- (2) Do not use any preservative coating on valve.
- (3) Place valve, with desiccant, in plastic bag, and seal plastic bag.
- (4) Store in a dry area.

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27550

COMPONENT MAINTENANCE MANUAL WITH IPL

FITS AND CLEARANCES

1. Table 801 presents the torque values necessary to assemble the valve.

UNIT	TORQUE lbf.in (N.m)
Valve Seat Assembly (240, IPL figure 1)	140 inch pounds (15.8)
Retainer (110)	300 inch pounds (33.8)

Assembly Torque Values
Table 801

35-01-22

Page 801/802

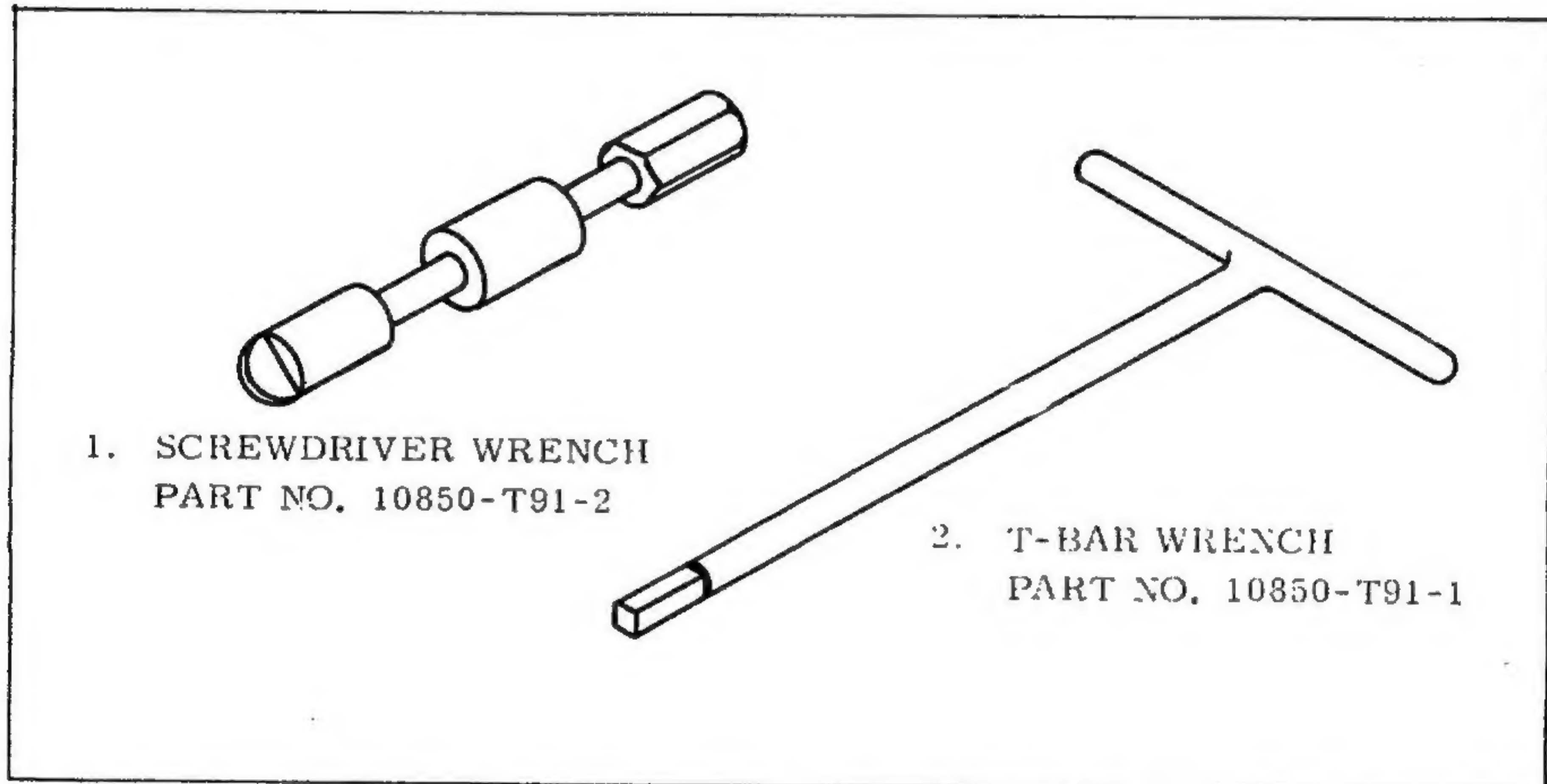
Mar 31/83

SPECIAL TOOLS, FIXTURES AND TEST EQUIPMENT

1. The special tools, fixtures and test equipment listed in Table 901 and illustrated in figure 901 are manufactured by Scott Aviation, Lancaster, New York. Equivalent materials may be used.

ITEM NO.	PART NUMBER	NOMENCLATURE	APPLICATION
1.	10850-T91-2	SCREWDRIVER WRENCH	To remove or replace valve seat assembly (240, IPL figure 1)
2.	10850-T91-1	T-BAR WRENCH	To remove or replace plug (230)

List of Special Tools, Fixtures and Test Equipment
Table 901



Special Tools, Fixtures and Test Equipment
Figure 901

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27550 COMPONENT MAINTENANCE MANUAL WITH IPL

ILLUSTRATED PARTS LIST

1. This Illustrated Parts List covers Oxygen Shut-Off Valve, Part Numbers 27550-1, 27550-3 and 27550-5.
2. Group Assembly Parts List
 - A. The Group Assembly Parts List consists of a parts listing and completely indexed exploded-view drawing.
 - B. The quantities listed in the "UNITS PER ASSY" column are the total quantity used per valve at the locations indicated.
 - C. The part numbers listed in the "PART NUMBER" column are Scott Aviation part numbers except vendor items which are listed by vendor part number. The following list contains the code, name, and address of vendors supplying parts and materials for the valve including those listed in Tables 101, 401 and 701.

VENDOR CODE

CODE	VENDOR'S NAME AND ADDRESS
V07098	Linde Division of Union Carbide Tonawanda, New York
V18873	E.I. DuPont DeNemours & Co., Inc. Petroleum Chemicals Division Wilmington, Delaware
V56878	Standard Pressed Steel Co. Jenkintown, Pennsylvania
V71984	Dow Corning Corporation Midland, Michigan
V91784	Hooker Chemical Corp. Niagara Falls, New York

- D. In the "EFFECT CODE" column, the effect code letter adjacent to the part signifies the end item (Item No. 1) to which the part belongs. No effect code letter (blank) indicates that the part is interchangeable between the end items. A list of the Oxygen Shut-Off Valve part numbers and their effect code letter follows.

PART NUMBER

EFFECT CODE

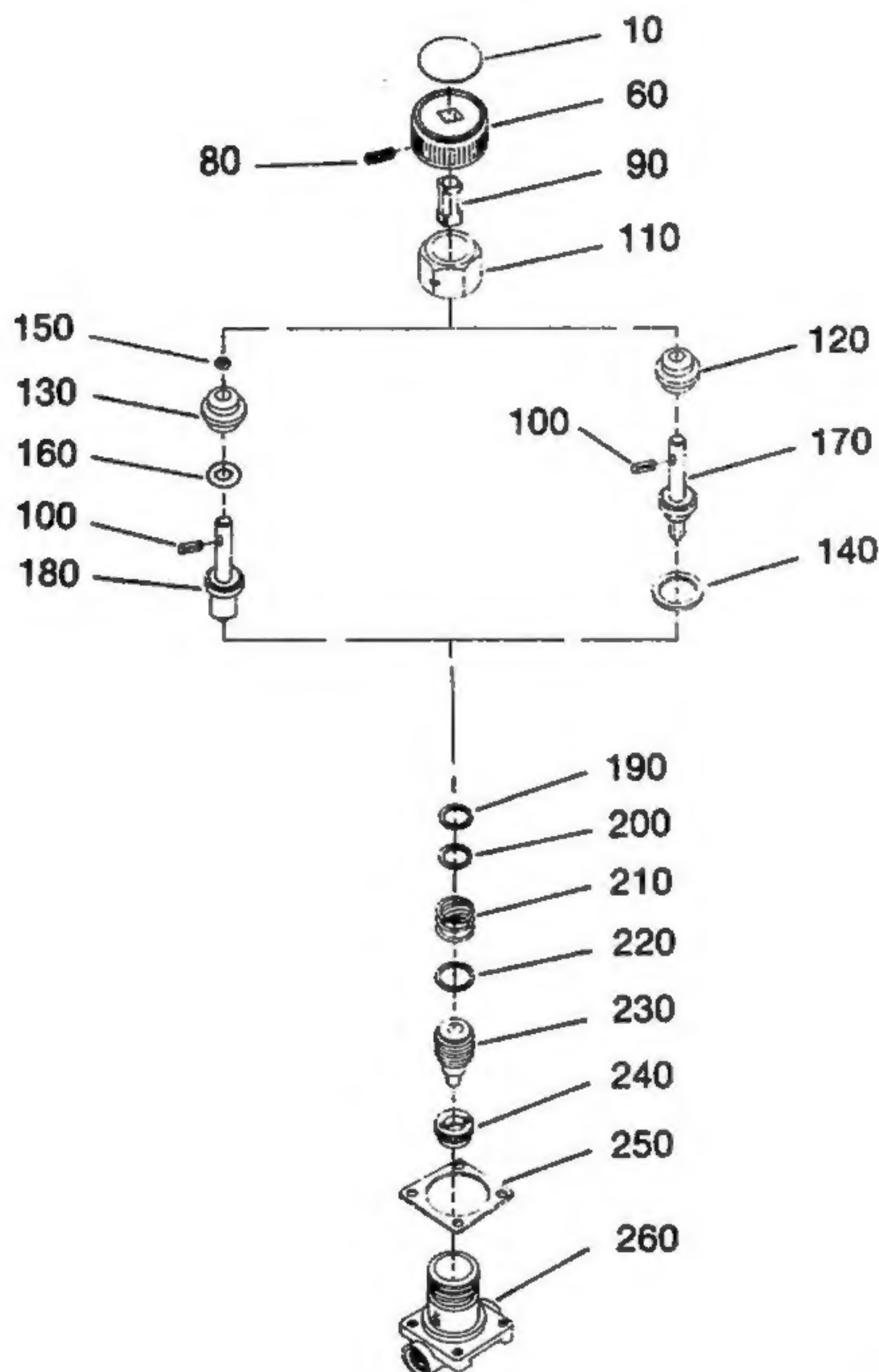
27550-1	A (THROUGH SN6999)
27550-3	B (THROUGH SN6999)
27550-5	C (THROUGH SN6999)
27550-1	D (SN7000 & SUBSEQUENT)
27550-3	E (SN7000 & SUBSEQUENT)
27550-5	F (SN7000 & SUBSEQUENT)

35-01-22

Page 1001
Mar 31/83

3. How to Use This Illustrated Parts List

- A. If neither the part number nor the nomenclature is known, the part can be compared with the exploded-view illustration. When located on the illustration, the index number on the illustration will refer to the item number in the Group Assembly Parts List which identifies the part number and the nomenclature.



Oxygen Shut-Off Valve
Figure 1



27550
COMPONENT MAINTENANCE MANUAL WITH IPL

FIG. ITEM	PART NUMBER	AIRLINE STOCK NO.	NOMENCLATURE 1234567	EFF CODE	UNITS PER ASSY
1-1	27550-1		VALVE-OXYGEN SHUT-OFF	AD	RF
-1A	27550-3		VALVE-OXYGEN SHUT-OFF	BE	RF
-1B	27550-5		VALVE-OXYGEN SHUT-OFF	CF	RF
10	27552-00		. PLATE-ID(BOEING ONLY)	AD	1
-20	28956-01		. PLATE-IDENTIFICATION	AD	1
-30	27552-01		. PLATE-ID(BOEING ONLY)	CF	1
-40	28956-02		. PLATE-IDENTIFICATION	CF	1
-50	27559-00		. PLATE-IDENTIFICATION	BE	1
60	27553-00		. HANDLE-VALVE	ABDE	1
-70	27553-01		. HANDLE-VALVE	CF	1
80	287086-98C-8		ATTACHING PARTS . SETSCREW		1
90	27557-00		-----*----- . INSERT-HANDLE		1
100	27558-00		ATTACHING PARTS . PIN-ROLL		1
110	27555-00		-----*----- . RETAINER-PACKING		1
120	10683-00		. GUIDE	ABC	1
130	10712-01		. GUIDE	DEF	1
140	10686-00		. WASHER	ABC	1
150	MS9068-010		. PACKING-PREFORMED	DEF	1
160	MS9068-014		. PACKING-PREFORMED	DEF	1
170	10688-01		. STEM ASSEMBLY	ABC	1
180	800994-00		. STEM ASSEMBLY	DEF	1
190	10699-00		. WASHER-THRUST		1
200	10698-00		. WASHER-THRUST		1
210	2813-00		. SPRING		1
220	2781-00		. WASHER	ABC	1
230	11225-00		. PLUG-VALVE		1
240	11232-01		. VALVE SEAT ASSEMBLY		1
250	27554-00		. GASKET		1
260	27551-00		. BODY (AND 10050-5 PORTS)	ACDF	1
-270	27551-01		. BODY (1/8 ANPT PORTS)	BE	1

- ITEM NOT ILLUSTRATED

35-01-22

Page 1003/1004
Mar 31/83